

PHASE BASED HTRW WBS

PHASES AND UNITS OF MEASURE: ENG(MET)						Optional Subproject Level							2nd	3rd	4th	5th	(Environmental Restoration & Waste Management)				
Ph1	Ph2	Ph3	Ph4	Ph5	Ph6	i	a	b	c	d	e	X	Lvl	Lvl	Lvl	Lvl					
PA/SI	RI/FS	RD	RA	O&M	PSLM	IRA						All	.21	.01			**	** Note: Repeat 4th level items for all 3rd level items under 2nd levels .21-.30.			
(CERCLA TERMS - REF. DICTIONARY FOR OTHER)						(Ref. Dictionary for explanation)														IN SITU BIOLOGICAL TREATMENT	
			X	X																	Biological Barrier
			varies	varies																	Capital: Construction or Installation of Treatment Components
			SF(M2)																		Capital: Pads/Foundations/Spill Control
			SF(M2)																		Capital: Mob/Setup of Non-Permanent Treatment Plant
			EA(EA)																		Capital: Ownership/Rental of Non-Perm Trtment Plant (Process Eq & Appurt)
			YR(YR)																		Capital: Start-up
			EA(EA)																		Capital: Non-Process Equipment (Office/Admin/Computer/Safety/Vehicles)
			EA(EA)																		Capital: Testing
			EA(EA)																		Capital: Permits/Licenses
			EA(EA)																		Capital: Training
			EA(EA)																		Capital: Project Engineering
			EA(EA)																		Capital: Major Plant Upgrades/Replacements
			EA(EA)																		Capital: Demob/Takedown of Non-Permanent Treatment Plant
			EA(EA)																		.13-.30 Not Used
			SF/YR(M2/YR)	SF/YR(M2/YR)																	O&M: Maintenance and Repair of Treatment Components
			YR(YR)	YR(YR)																	O&M: Contaminated Material Pre-Processing
			YR(YR)	YR(YR)																	O&M: Plant Operation Materials (Bulk Chemicals/Raw Materials)
			YR(YR)	YR(YR)																	O&M: Plant Operation Labor
			YR(YR)	YR(YR)																	O&M: Non-Process Equipment (Office/Admin/Computer/Safety/Vehicles)
			YR(YR)	YR(YR)													O&M: Plant Operation Energy (Fuel/Utilities)				
			YR(YR)	YR(YR)													O&M: Ownership/Rental of Non-Perm Trtment Plant (Process Eq & Appurt)				
			YR(YR)	YR(YR)													O&M: Maintenance and Minor Plant Upgrades/Replacements				
			YR(YR)	YR(YR)													O&M: Analytical Services				
			YR(YR)	YR(YR)													O&M: Monitoring (Performance/Compliance)				
			YR(YR)	YR(YR)													O&M: Training				
			YR(YR)	YR(YR)													O&M: Permits/Licenses				
																	Other				
																	Bioslurping				
																	Bioventing/Biosparging				
																	Cometabolic Biotreatment				
																	Constructed Wetlands				
																	Enhanced Bioremediation				
																	Land Treatment				
																	Natural attenuation				
																	Phytoremediation				
																	Other				
			X	X									.22				EX SITU BIOLOGICAL TREATMENT				
																	Activated Sludge				
																	Biofilter				

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														.03			Biopile
														.04			Cometabolic Biotreatment
														.05			Genetically Engineered Organisms (White Rot Fungus)
														.06			Land Farming / Composting
														.07			Rotating Biological Contactors
														.08			Slurry Biodegradation
														.09			Trickling Filter
														.9X			Other
			X		X								.23				IN SITU CHEMICAL TREATMENT
														.01			Chemical Barriers
														.02			Chemical Extraction
														.03			Oxygen Release Compounds
														.04			Neutralization
														.05			Soil Flushing (Surfactant / Solvent)
			X		X								.24				EX SITU CHEMICAL TREATMENT
														.01			Alkali Metal / Polyethylene Glycol
														.02			Base-Catalyzed Decomposition Process
														.03			Chemical Hydrolysis
														.04			Chlorination
														.05			Dehalogenation
														.06			Hydrogen reduction
														.07			Ion Exchange
														.08			Neutralization
														.09			Oxidation / Reduction
														.10			Oxygen Release Compounds
														.11			Ozonation
														.12			Solvent Extraction
														.13			Ultraviolet Photolysis
			X		X								.25				Other
																	IN SITU PHYSICAL TREATMENT
														.01			Coatings
														.02			Circulating Wells / In-Well Air Stripping
														.03			Air Sparging
														.04			Condensation
														.05			Cryogenics
														.06			Fracturing (Hydrofracturing)
														.07			Lasagna Process
														.08			Laser Cutting
														.09			Laser Decontamination
														.10			Passive Treatment Wall/Reactive Barriers
														.11			Skimming

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			X	X									.12				Soil Flushing
													.13				Solids Dewatering / Drying
													.14				Steam Extraction
													.15				Vacuuming/Blasting
													.9X				Other
												.26					EX SITU PHYSICAL TREATMENT
													.01				Aeration
													.02				Advanced Electrical Reactor
													.03				Agglomeration
													.04				Air Stripping
													.05				Chelation
													.06				Coagulation / Flocculation / Precipitation
													.07				Compaction / Volume Reduction
													.08				Condensation
													.09				Decant / Phase Separation
													.10				Dissolved Air Floatation
													.11				Distillation
													.12				E-Beam
													.13				Electrochemical oxidation
													.14				Electrokinetics
													.15				Electrolysis
													.16				Equalization
													.17				Evaporation
													.18				Filter Presses
													.19				Filtration
													.20				Freeze Crystallization
													.21				Granular Activated Carbon Absorption-Gases/Vapor
													.22				Granular Activated Carbon Absorption-Liquids
													.23				Heavy Media Separation
													.24				High Pressure Aqueous Destruction
													.25				Lignin Adsorption / Sorptive Clays
													.26				Magnetic Separation
													.27				Membrane Separation-Electrodialysis
													.28				Membrane Separation-Reverse Osmosis
													.29				Oil / Water Separation
													.30				Sedimentation
													.31				Shredding
													.32				Sieving/Straining
													.33				Skimming
													.34				Soil Vapor Extraction
													.35				Soil Washing (Surfacant / Solvent)
													.36				Solids Dewatering/Drying

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														.37			Sprinkler Irrigation
														.38			Supercritical Extraction
														.39			Surfactant Enhanced Recovery
														.40			Synthetic Resin Adsorption
														.9X			Other
			X		X								.27				IN SITU THERMAL TREATMENT
														.01			Thermal Blanket
														.02			Six Phase Extraction
														.03			In Situ Heating - Vacuum Extraction
														.04			Steam/Hot Water Injection Vacuum Extraction
														.05			High Temperature Thermal Desorption
														.06			In Situ Vitrification (SVOC Destruction)
														.07			Low Temperature Thermal Desorption
														.9X			Other
			X		X								.28				EX SITU THERMAL TREATMENT
														.01			High Temperature Thermal Desorption
														.02			Incineration
														.03			Low Temperature Thermal Desorption
														.04			Molten Salt Destruction
														.05			Open Burning / Open Detonation
														.06			Plasma
														.07			Pyrolysis
														.08			Radio Frequency Heating
														.09			Solar Detoxification / Evaporation
														.10			Steam Stripping / Flushing / Reforming
														.11			Supercritical Water Oxidation
														.12			Thermally Enhanced Vapor Extraction
														.9X			Other
			X		X								.29				IN SITU STABILIZATION/FIXATION/ENCAPSULATION
														.01			Fixation / Grout Injection
														.02			Inorganic / Asphalt-Based Encapsulation
														.03			Pozzolan Process
														.04			Vitrification
														.9X			Other
			X		X								.30				EX SITU STABILIZATION/FIXATION/ENCAPSULATION
														.01			Calcination
														.02			Inorganic / Asphalt-Base Encapsulation
														.03			Organic based encapsulation
														.04			Pozzolan Process (lime/Portland Cement)
														.05			Retort / Amalgamation
														.06			Sludge Stabilization (Aggregate / Rock / Slag)
														.07			Vitrification

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														.9X			Other	